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SUBJECT: Trip Report: Surveyor/Orbiter Utilization Committee, Lunar Orbiter D Mission at JPL, February 9, 1967 - Case 340

DATE: February 14, 1967

FROM: D. B. James

ABSTRACT

The Surveyor/Orbiter Utilization Committee met at JPL on February 9, 1967, to review and approve the mission plan for Lunar Orbiter D.

Lunar Orbiter D will act as a back up for Lunar Orbiter Mission III, now in initial high orbit prior to the beginning of Apollo site selection photography. If Mission III is successful, Lunar Orbiter D will be programmed to provide 85% monoscopic coverage of the front face of the moon at a resolution of 65 to 85 meters.

The mission options for Lunar Orbiter E were also discussed and O. W. Nicks (SL) was asked to form a planning group with representation from the interested program offices and the scientific community to examine the tradeoffs and to recommend a mission mode to the committee.

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MEMORANDUM FOR FILE

The Surveyor/Orbiter Utilization Committee met at JPL on February 9, 1967, to review and approve the mission plan for Lunar Orbiter D. The mission options for Lunar Orbiter E were also discussed.

In the event of the failure of Lunar Orbiter III, now in initial high orbit, Lunar Orbiter D would be programmed to refly mission III in support of Apollo landing site selection. If Lunar Orbiter III is successful, Lunar Orbiter D will be programmed to monoscopically photograph 85% of the front face of the moon at a resolution of 65 to 85 meters. To achieve this coverage the orbit inclination will be approximately 85°. The pericynthion and apocynthion altitudes will be approximately 2,000 and 6,000 km respectively. Either four or five frames will be exposed on each orbital pass, timed so that there is contiguous coverage with the telephoto camera photographs. Readout is planned between photographs in an attempt to keep current with the photography and hence avoid the need for a final readout. This plan would conserve attitude control gas for a 6-9 month extended mission capability and allow the spacecraft to be used in the validation of the MSN tracking and orbit determination systems.

All of the high resolution pictures (65-85 m) and half of the medium resolution pictures (~ 500 m) can be read out.

The mission options for Lunar Orbiter E were also discussed. They are as follows:

1. Refly mission III in the event that insufficient Apollo site selection photography has been obtained from III and D;

2. Refly the broad coverage front face mission D in the event that mission D were unsuccessful;

3. Fly a backside broad coverage mission similar to mission D;

[redacted]

4. Fly a frontside mission with spot coverage of about 50 targets with a resolution of 1-3 meters.

In order to provide time for the orderly planning of Mission E, a decision must be made in about three weeks whether option 3 or 4 is to be chosen. There are several spacecraft constraints which, if not overcome, may limit the orbital inclination of option 4 to 45°. This would, in turn, limit the useful lighting band to about 20° in latitude. If these constraints can be overcome and inclinations up to 85° are allowable, then high resolution spot coverage could be obtained anywhere on the front face (85% of visible surface).

Mr. O. W. Nicks was asked to set up a Mission E planning group with representation from the Planetology Subcommittee, the USGS, the Lunar Orbiter Program Office, Surveyor Program Office, the Apollo Applications Program Office and the Apollo Program Office to examine the tradeoffs inherent in the choice of the mission E mode. This group would discuss the possible targets, the effect of restrictive lighting bands and the pros and cons of backside versus frontside both from the point of view of the scientific return from the mission itself and of the support the photography could give the other lunar exploration spacecraft.

In the event of a spot coverage mission choice, preliminary target selection would have to be made at about April 15, 1967 to allow The Boeing Company time to lay out the detailed mission plan. These targets could be reviewed and revised after the examination of mission D photography during the month of June, however, at that time the target changes would have to be restricted to the predetermined lighting band (April 15th milestone).

Mr. J. Eggleston alerted the committee to the possibility of an Apollo Program requirement on Mission E to provide regional slope data at Apollo sites in the Apollo belt arising out of ongoing analysis of the radar approach path problem and the absolute accuracy of slope reduction from Orbiter III data.

The Lunar Orbiter Project Office requested a Surveyor/Orbiter Utilization Committee meeting around March 1st to approve preliminary plans for Mission E and the Surveyor Project Office requested a meeting around March 15th to review Surveyor C targeting. It was agreed that if internal milestones prevented the combining of the two requests separate meetings would be held.

D. B. James

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